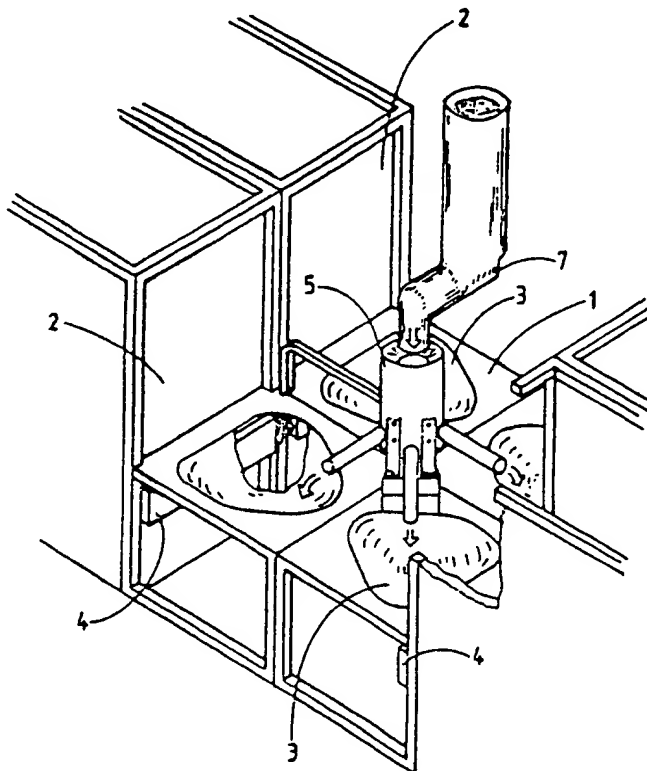


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE87/00293 <b>(22) International Filing Date:</b> 24 June 1987 (24.06.87)  <b>(31) Priority Application Number:</b> 8602868-5 <b>(32) Priority Date:</b> 27 June 1986 (27.06.86) <b>(33) Priority Country:</b> SE  <b>(71) Applicant (for all designated States except US):</b> ALFA-LAVAL AGRI INTERNATIONAL AB [SE/SE]; Farm Center, P.O. Box 39, S-147 00 Tumba (SE).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only) :</b> LUNDIN, Sören [SE/SE]; Ladjursvägen 9, S-196 00 Märsta (SE). ANDERSSON, Sven [SE/SE]; Institutionen för Lantbruksteknik, Box 7033, S-750 07 Uppsala (SE). ERIKSSON, Sven-Ingvar [SE/SE]; Malmgårdsvägen 6, S-116 38 Stockholm (SE).		<b>(74) Agent:</b> CLIVEMO, Ingemar; Alfa-Laval AB, P.O. Box 500, S-147 00 Tumba (SE).  <b>(81) Designated States:</b> AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), US.  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

**(54) Title:** FEEDING STATION FOR LOOSE GOING ANIMALS**(57) Abstract**

A feeding station (1) for loose going animals is provided with a device (4) which senses the presence of an animal, a device (5) to distribute fodder in a feeding trough, a device (7) which portions the fodder in the fodder distributor (5) and a device (8) which after a signal that an animal is present activates the device which portions fodder. In the feeding station these devices serve at least two separate feeding troughs (3). At least two of the devices are common to the feeding troughs and at least one of these is movable between the feeding troughs in such a way that feeding of at least two animals may take place at the same time.



## FEEDING STATION FOR LOOSE GOING ANIMALS

The present invention relates to a feeding station for loose going animals provided with a device which senses the presence of an animal, a device to portion fodder in a feeding trough and a device which after a signal that an animal is present activates the device which  
5 portions fodder.

Feeding stations of this kind are built up with a central control unit which controls the feeding to the animals. They are usually used to feed cows and these are then provided with an identifying disc.  
10 When the cow arrives to the feeding station, the control unit controls if the cow is entitled to fodder and if that is the case the portioning of fodder starts. A feeding station of this kind is provided with a device which senses and identifies the cow, a portioning device and is connected to a control unit which may be  
15 common to several feeding stations.

The feeding station according to the invention is mainly characterized in that the devices mentioned above serve at least two separate feeding troughs, that at least one of the devices is common to the  
20 feeding troughs and that at least one of the devices mentioned earlier is movable between the feeding troughs in such a way that feeding may take place simultaneously to at least two animals. The feeding station according to the invention implies that the equipment in the feeding station may be utilized in a better way, since several animals can  
25 eat at the same time.

A feeding station of this kind efficiently makes use of the electronics and implies important saving of costs, since expensive units may be used to feed several animals at the same time.  
30

The feeding station according to the invention is with advantage designed such that every feeding trough which is a part of the feeding station is provided with a device which may sense the presence

of an animal. The device which senses the presence of the animal may be designed in many ways, but is suitably formed as a scanner, that is a receiving unit which senses the signals in the disc which every animal is provided with. The cows usually have their disc in a string  
5 around the neck, smaller animals as calves and pigs may have their disc or their tag in one of their ears. If suitable an individual identification may take place of every separate animal in order to increase the control, that each animal receives a suitable amount of fodder.

10

The scanner may with advantage be arranged to be activated only under a short period of time and at that time sense if an animal is present at the feeding station or not.

15

In certain cases it may be suitable to provide the feeding station with a scanner which is common for all the feeding troughs and which moves between these to sense the presence of an animal. This may be the case if a more expensive scanning equipment is necessary.

20

The feeding station according to the invention may with advantage be shaped such that the device which portions fodder to each feeding trough is movable between the feeding troughs and may move between these in such a way that several animals can eat at the same time.

25

The fodder distributing device may be formed such that it is movable between the different feeding troughs all the time and when an animal is present at a feeding trough portions fodder to the same. By way of such an arrangement the animals may receive an amount of fodder each time the fodder distributing device passes the feeding trough.

30

such that the animal has access to fodder all the time.

The feeding station is with advantage connected to a control unit which after a signal that an animal is present at the feeding trough gives an impulse to a fodder portioning device which transports  
35 fodder to the fodder distributing device.

The movement of the fodder distributing device between the different feeding troughs may suitably be obtained by way of a motor, the operation of which is stopped after an impulse which indicates that the fodder distributing device has moved forward to a feeding trough  
5 and the operation of which is resumed after a predetermined period of time.

It is also suitable to design the feeding station such that both the scanner and the fodder distributing device are movable between the  
10 feeding troughs.

The feeding station according to the invention is described further with reference to the attached drawings which show an embodiment of the same chosen as an example only.

15

In fig 1 there is shown a layout drawing of a feeding station for four animals, in fig. 2 how the separate units in the feeding station are connected to each other and in fig. 3 there is shown a fodder distributing device partly in cross section.

20

The feeding station 1 serves four feeding boxes 2, each provided with a feeding trough 3. Under the feeding troughs there are in each box a scanner 4. Between the four boxes there is a central fodder distributing device 5. This is provided with four outlet pipes 6, each  
25 of which leading to a feeding trough. Over the fodder distributing device there is a fodder portioning device 7, which is connected to a supply of fodder which is not shown.

As may be seen in fig. 2 the scanners 4 are connected to a control  
30 unit 8. Under the fodder portioning device 7, which also is connected to the control unit 8, there is a movable distributing pipe 9. The movement of the distributing pipe is achieved by way of a motor 10. The distributing pipe may move forwards in a stepwise manner and stop at an outlet pipe 6. The motor 10 is stopped by a signal from the  
35 rotation sensor 11. This consists of a magnet 12 which is fastened

to the rotation axis 13 and a circuit card with a tongue element. There is a tongue element for each outlet pipe. When the distributing pipe is stopped, the scanner of the feeding trough is connected to the control unit 8. The control unit senses if an animal with an  
5 identification disc is present at the feeding trough. If the animal is entitled to fodder, the fodder portioning device 7 starts and fodder flows down through the distributing and outlet pipe to the feeding trough. When the animal has received a suitable portion, the scanner signal is broken and the fodder portioning device stops.  
10 When this has stopped and the distributing pipe is empty, the pipe is rotated to the next eating place.

In fig 3. there is shown more in detail how the fodder distributing unit is constructed. The movable part of the distributing pipe is  
15 driven round by the motor 10 by way of the driving shaft 13. Fodder enters the fodder distributing unit by way of an inlet funnel 14 and is distributed by way of the distributing pipe 9 to the outlet pipe 6. (In the figure only one of the four outlet pipes is shown.) The movement of the motor is transmitted to the driving shaft 13 by way of  
20 a gear box 15. The driving shaft 13 is extended in order to extend through and under a circuit card 16 below the motor, on which circuit card there is a tongue element 17. On the driving shaft 13 there is also a magnet 12 which follows the movement of the driving shaft.

25 When the magnet 12 is located in front of the tongue element 17 a circuit is closed in such a way that the scanner is connected to the control unit 8. The rotation motor 10 is stopped. If the scanner 4 senses the presence of an animal, and if desired identifies the same, the control unit 8 gives a signal to the fodder portioning device 7  
30 which works during a predetermined time. When this time is ended, the motor 10 starts. If the scanner does not indicate the presence of an animal, the motor 10 starts after a certain time.

Motor, gear box and circuit card are enclosed in a box 18 which  
35 secures that the driving function of the fodder distributing device

is not effected by the environment in the stable which is demanding from an operational point of view.

This embodiment of a feeding station according to the invention is only one of several possible solutions. The feeding station may serve two or more feeding places. These may be grouped in different ways around the central fodder distributing unit. The animals may also if so is desired be fed with more than one kind of fodder. The control unit may serve several feeding stations. Sensing of the presence of an animal may take place by rotating the rotation sensor separately and firstly when the presence of an animal is sensed it gives an impulse to the control unit which then forces the distributing pipe to move. The scanners may, instead of being arranged stationary at the feeding boxes as is shown on the drawing, be arranged to rotate synchronously with the fodder distributing device.

Claims

1. Feeding station (1) for loose going animals provided with a device (4) which senses the presence of an animal, a device (9) to portion  
5 fodder in a feeding trough and a device (8) which after a signal that an animal is present activates the device (9) which portions fodder, c h a r a c t e r i z e d i n that the feeding station comprises at least two separate feeding troughs (3), and in that  
10 either the device (4) which senses the presence of an animal or the device which portions fodder in a feeding trough is movable between the feeding troughs in such a way that feeding may take place at the same time to at least two animals.
2. Feeding station according to claim 1, c h a r a c t e r i z e d  
15 i n that each feeding trough (3) is provided with a device (4) which senses the presence of an animal.
3. Feeding station according to claim 1-2, c h a r a c t e r i -  
z e d i n that the device (4) which senses the presence of an animal  
20 is activated during a short period of time.
4. Feeding station according to claim 1, c h a r a c t e r i z e d  
i n that the device which senses the presence of an animal is movable  
25 between the feeding troughs which form part of the feeding station.
5. Feeding station according to any of the preceding claims,  
c h a r a c t e r i z e d i n that the device which senses the presence of an animal also identifies the same, which makes it possible to feed each animal individually.  
30
6. Feeding station according to claim 1-3, c h a r a c t e r i -  
z e d i n that the device (9) which distributes fodder to each feeding trough is movable between the feeding troughs (3) and may  
move between the different feeding troughs in such a way that fodder  
35 may be portioned to animals, the presence of which has been felt, at which these animals may eat at the same time.

7. Feeding station according to claim 6, c h a r a c t e r i -  
z e d i n that the device which distributes fodder is arranged to  
move between the different feed troughs all the time and when a  
signal has been obtained that an animal is present at the feeding  
trough portions fodder to the same.

5

8. Feeding station according to claim 7, c h a r a c t e r i -  
z e d i n that the signal from the device which senses the presence  
of an animal is forwarded to a control unit (8) which may be common  
10 to several feeding stations, which control unit gives an impulse to  
a fodder portioning device (7) which transports fodder to the fodder  
distributing device.

9. Feeding station according to claim 8, c h a r a c t e r i -  
15 z e d i n that the movement of the fodder distributing device  
between the feeding troughs is achieved by way of a motor (10), the  
operation of which is stopped by an impulse which indicates that the  
fodder distributing device has moved to a feeding trough (3) and  
the operation of which is resumed after a predetermined period  
20 of time.

10. Feeding station according to claim 4, c h a r a c t e r i -  
z e d i n that also the fodder distributing device is movable  
between the feeding troughs and follows the movement of the sensing  
25 device between the feeding troughs.



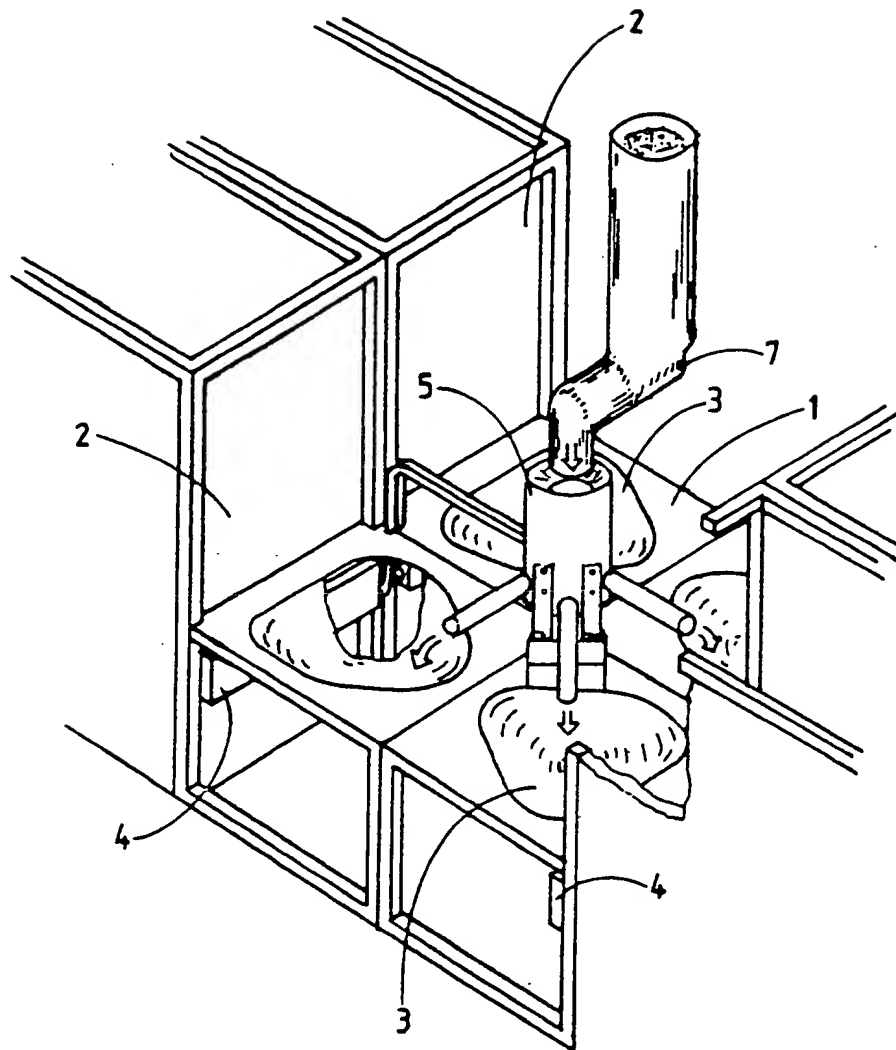


Fig. 1

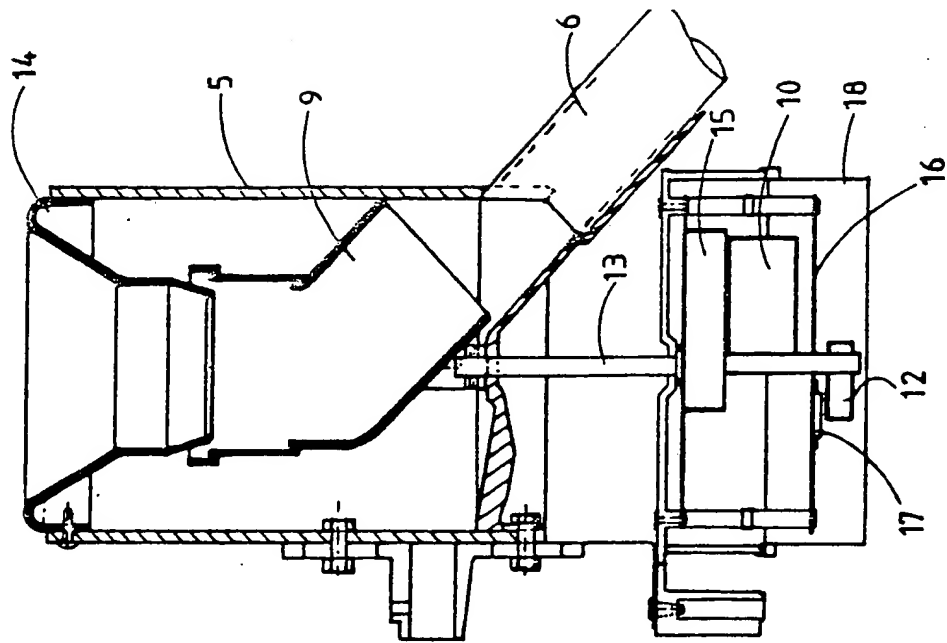


Fig. 3

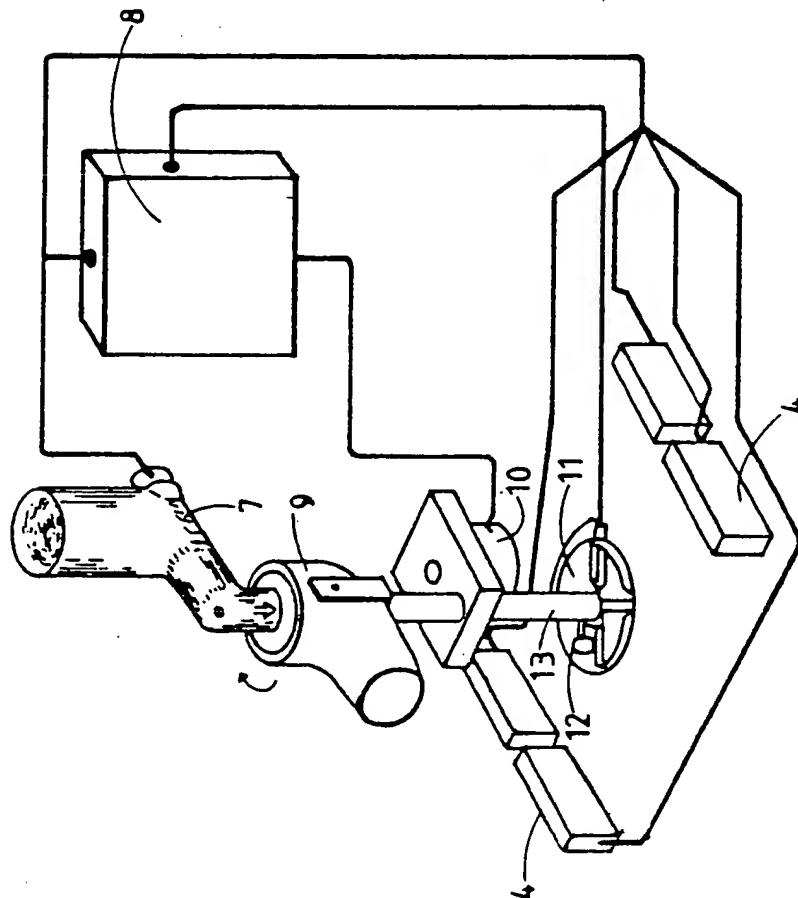


Fig. 2


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# INTERNATIONAL SEARCH REPORT

International Application No. PCT/SE87/00293

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>1</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC <span style="float: right;">4</span>		
A 01 K 5/02		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>2</sup>		
Classification System	Classification Symbols	
IPC 4	A 01 K 5/00, /02, 39/01, /012	
US C1	119: 51, 51.11-15, 52, 53, 53.5, 56, 57	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>3</sup>		
SE, NO, DK, FI classes as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>4</sup></b>		
Category <sup>5</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
Y	DE, A, 3 438 612 (ALFA-LAVAL AGRAR GMBH) 24 April 1986	1, 5, 6
Y	US, A, 3 541 995 (FATHANER) 24 November 1970	1, 2, 3, 5
Y	US, A, 4 350 118 (OSTLER) 21 September 1982 & US, 4461241	1, 2, 3, 5
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
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